9.4 Integrals of Trigonometric Functions

962. $\int \sin x dx = -\cos x + C$

963. $\int \cos x dx = \sin x + C$

964. $\int \sin^2 x \, dx = \frac{x}{2} - \frac{1}{4}\sin 2x + C$

965. $\int \cos^2 x \, dx = \frac{x}{2} + \frac{1}{4}\sin 2x + C$

966. $\int \sin^3 x \, dx = \frac{1}{3}\cos^3 x - \cos x + C = \frac{1}{12}\cos 3x - \frac{3}{4}\cos x + C$

967. $\int \cos^3 x \, dx = \sin x - \frac{1}{3}\sin^3 x + C = \frac{1}{12}\sin 3x + \frac{3}{4}\sin x + C$

968. $\int \frac{dx}{\sin x} = \int \csc x \, dx = \ln\left|\tan\frac{x}{2}\right| + C$

969. $\int \frac{dx}{\cos x} = \int \sec x \, dx = \ln\left|\tan\left(\frac{x}{2} + \frac{\pi}{4}\right)\right| + C$

970. $\int \frac{dx}{\sin^2 x} = \int \csc^2 x \, dx = -\cot x + C$

971. $\int \frac{dx}{\cos^2 x} = \int \sec^2 x \, dx = \tan x + C$

972. $\int \frac{dx}{\sin^3 x} = \int \csc^3 x \, dx = -\frac{\cos x}{2\sin^2 x} + \frac{1}{2}\ln\left|\tan\frac{x}{2}\right| + C$

973. $\int \frac{dx}{\cos^3 x} = \int \sec^3 x\, dx = \frac{\sin x}{2\cos^2 x} + \frac{1}{2}\ln\left|\tan\left(\frac{x}{2}+\frac{\pi}{4}\right)\right| + C$

974. $\int \sin x \cos x\, dx = -\frac{1}{4}\cos 2x + C$

975. $\int \sin^2 x \cos x\, dx = \frac{1}{3}\sin^3 x + C$

976. $\int \sin x \cos^2 x\, dx = -\frac{1}{3}\cos^3 x + C$

977. $\int \sin^2 x \cos^2 x\, dx = \frac{x}{8} - \frac{1}{32}\sin 4x + C$

978. $\int \tan x dx = -\ln|\cos x| + C$

979. $\int \frac{\sin x}{\cos^2 x} dx = \frac{1}{\cos x} + C = \sec x + C$

980. $\int \frac{\sin^2 x}{\cos x} dx = \ln\left|\tan\left(\frac{x}{2}+\frac{\pi}{4}\right)\right| - \sin x + C$

981. $\int \tan^2 x\, dx = \tan x - x + C$

982. $\int \cot x dx = \ln|\sin x| + C$

983. $\int \frac{\cos x}{\sin^2 x} dx = -\frac{1}{\sin x} + C = -\csc x + C$

984. $\int \frac{\cos^2 x}{\sin x} dx = \ln\left|\tan\frac{x}{2}\right| + \cos x + C$

985. $\int \cot^2 x\,dx = -\cot x - x + C$

986. $\int \frac{dx}{\cos x \sin x} = \ln|\tan x| + C$

987. $\int \frac{dx}{\sin^2 x \cos x} = -\frac{1}{\sin x} + \ln\left|\tan\left(\frac{x}{2} + \frac{\pi}{4}\right)\right| + C$

988. $\int \frac{dx}{\sin x \cos^2 x} = \frac{1}{\cos x} + \ln\left|\tan\frac{x}{2}\right| + C$

989. $\int \frac{dx}{\sin^2 x \cos^2 x} = \tan x - \cot x + C$

990. $\int \sin mx \sin nx\,dx = -\frac{\sin(m+n)x}{2(m+n)} + \frac{\sin(m-n)x}{2(m-n)} + C,$
$m^2 \neq n^2.$

991. $\int \sin mx \cos nx\,dx = -\frac{\cos(m+n)x}{2(m+n)} - \frac{\cos(m-n)x}{2(m-n)} + C,$
$m^2 \neq n^2.$

992. $\int \cos mx \cos nx\,dx = \frac{\sin(m+n)x}{2(m+n)} + \frac{\sin(m-n)x}{2(m-n)} + C,$
$m^2 \neq n^2.$

993. $\int \sec x \tan x dx = \sec x + C$

994. $\int \csc x \cot x dx = -\csc x + C$

995. $\int \sin x \cos^n x\,dx = -\frac{\cos^{n+1} x}{n+1} + C$

996. $\int \sin^n x \cos x \, dx = \frac{\sin^{n+1} x}{n+1} + C$

997. $\int \arcsin x \, dx = x \arcsin x + \sqrt{1-x^2} + C$

998. $\int \arccos x \, dx = x \arccos x - \sqrt{1-x^2} + C$

999. $\int \arctan x \, dx = x \arctan x - \frac{1}{2}\ln\left(x^2+1\right) + C$

1000. $\int \operatorname{arc\,cot} x \, dx = x \operatorname{arc\,cot} x + \frac{1}{2}\ln\left(x^2+1\right) + C$